

### **Wooded Areas Can Be Served by Northpoint Signals**

The observations from this experiment are basically that NP reception in wooded areas is feasible when the NP transmitter is at least partially visible through the foliage. At both sites a physical survey was made of the homes surrounding the site and it was determined that within these residential areas it would be straightforward to locate an antenna position for suitable reception.

## **E. Intermediate and Far Range Tests**

### **Good Northpoint Signal Present at Almost 14 Miles**

Numerous sites were tested at distances between 2 miles to 13.8 miles from the NP transmitter; and although the full signal integrity tests were done on all sites, it quickly became clear that any NP-DBS interaction was no longer detectable at distances beyond 1 to 2 miles. The principal objective for these sites was to examine the feasibility of NP signal reception and to assess the service area size for the prevailing conditions.

### **No Impact on DBS Signal**

The data and results for these sites are tabulated in Figures IV-3 through IV-6. It is clear that the relevant pdix values are all close to unity, suggesting that no DBS signal error influence is present. The DBS satellite signal powers remain virtually the same for all sites, of course, except where physical obstructions exist. The NP signal powers, while showing anticipated variations from place to place, are viable for all sites tested, and a good NP TV signal was obtained at all sites.

## **F. Signal Measurements North of NP Transmitter**

Sites 22, 23, 24, and 25 were used to sample a region of downtown Austin in the area to the northwest of the NP transmitter. Site 25 is actually in a residential area to the west of the main downtown area. These sites are shown in the Figure IV-2 Site Map and are also visible in some of the aerial photo maps. The purpose for these sites was to examine the NP transmitter signal strength in the area 'behind' the transmitter, where the signal is expected to be lower due to the directional pattern of the transmit antenna. A further objective was to investigate the issues of NP signal reception, multi-pathing and DBS interference in this environment.

### No Negative Impact on DBS Reception

The data and results for these sites are tabulated in Figures IV-3 through IV-6. All signals were good, and it is clear from the pdix values in the table that these sites are not affected by NP-DBS interference.

A reflection search was done at Site 22, where a substantial reflection was found from the Bank-One parking garage located to the NE of the site. This building is mainly composed of reflective glass. The measured reflected signal power was  $P_x = -56$  dBm, whereas, the direct NP signal power was  $-48.2$  dBm. Other much smaller reflections were observed but not recorded. No problems were found to result from the measured reflection or any others.

Substantial NP signal reflections could be found in most cases, but there was no evidence of any problem resulting from the reflections to either the DBS systems or to the NP system. It is likely that such reflections, when they exist, can be used as an aid to receiving the NP signal in places where the NP transmitter is not visible, while at the same time having no ill effect on the DBS signals.

### Field Data Confirm Predicted Values

The direct NP signal power for the four sites, when adjusted for constant range, appears to roughly conform with the azimuth related attenuation of the ideal NP-Tx antenna pattern. Although the NP signal power is reduced in this region, it does appear that the region could be used as a viable part of the service area, as the NP signal is adequate, and no interference problems have been found.

## V. Conclusions

This project has examined the issue of Northpoint to DBS interference in a real-world service area environment for a range of expected adverse conditions. Substantial testing was done in near range areas where the Northpoint signal is the strongest, and special tests were done in the specific zones of maximum interference potential (MIP) for both DirecTV and Echostar service. Special attention was given to the matters of multi-path propagation of the Northpoint signal, due to possible reflections from buildings and other structures -- an almost certain occurrence in an urban environment. Tests were conducted for which strong potentially interfering Northpoint signals, both direct path and reflected path, were directed toward the front side of the DBS antenna, as well as the back side. Potentially adverse conditions were sought out and tested, and shown to have no adverse

affect on the DBS service. Also, during the test period, a relatively wide range of weather conditions occurred, with ambient temperatures ranging from below freezing to over 70 degrees, with the skies varied from clear to heavy overcast and rain.

### **Thirty Sites Tested, None Experienced DBS Signal Failure**

A total of 30 test sites were examined over a period of 10 days, and numerous side experiments were done over an extended period. However, during these tests, there was not a single occurrence of DBS signal failure attributed to the normal operation of the Northpoint transmitter.

As discussed in this report, the DBS antenna pointing aid, referred to herein as the 'signal strength pointer' (ssp) was used extensively to provide a pseudo-quantitative indication of the error rate in the DBS signal. Tests confirmed that the ssp value is responsive to the presence of the Northpoint signal in the very close-range areas where the presence of the NP signal is manifested as a slight reduction in the ssp value for the affected DBS transponder. However, in all cases and without any mitigation techniques, the ssp value was still above the recommended threshold given in the installation manual, and thus never impacted the margin required for reception. Furthermore, this small influence quickly diminishes to near zero as the DBS receiving site location moves away from the immediate vicinity of the Northpoint transmitter.

### **Multi-pathing Not a Problem**

Regarding secondary reflections of the Northpoint signal, it is noteworthy that, while testing numerous sites in the presence of strong reflections there were no indications of ill influence due to the reflections. This is true in all cases, even when the reflected signals illuminated the front side of the DBS antenna at various angles. There has been no indication that any of the reflections contributed significantly to ssp value depression, as confirmed by numerous observations.

### **Northpoint is a Viable Technology**

In addition to the positive results obtained in regard to DBS interference considerations, the tests to examine the viability of Northpoint signal reception over the intended service area were very successful. These promising experiments included tests in which the Northpoint signal was seen through heavy foliage and under various weather conditions including rain. In addition, some sites as distant as almost 14 miles received a usable signal. It is clearly evident that the Northpoint signal as operated in this test could be suitable for service area coverage exceeding 10 miles.

This urban test further demonstrated that it is clearly reasonable to expect that the

**Northpoint technology can co-exist with the DBS satellite service in harmony and mutual benefit.**

## **FIGURES**

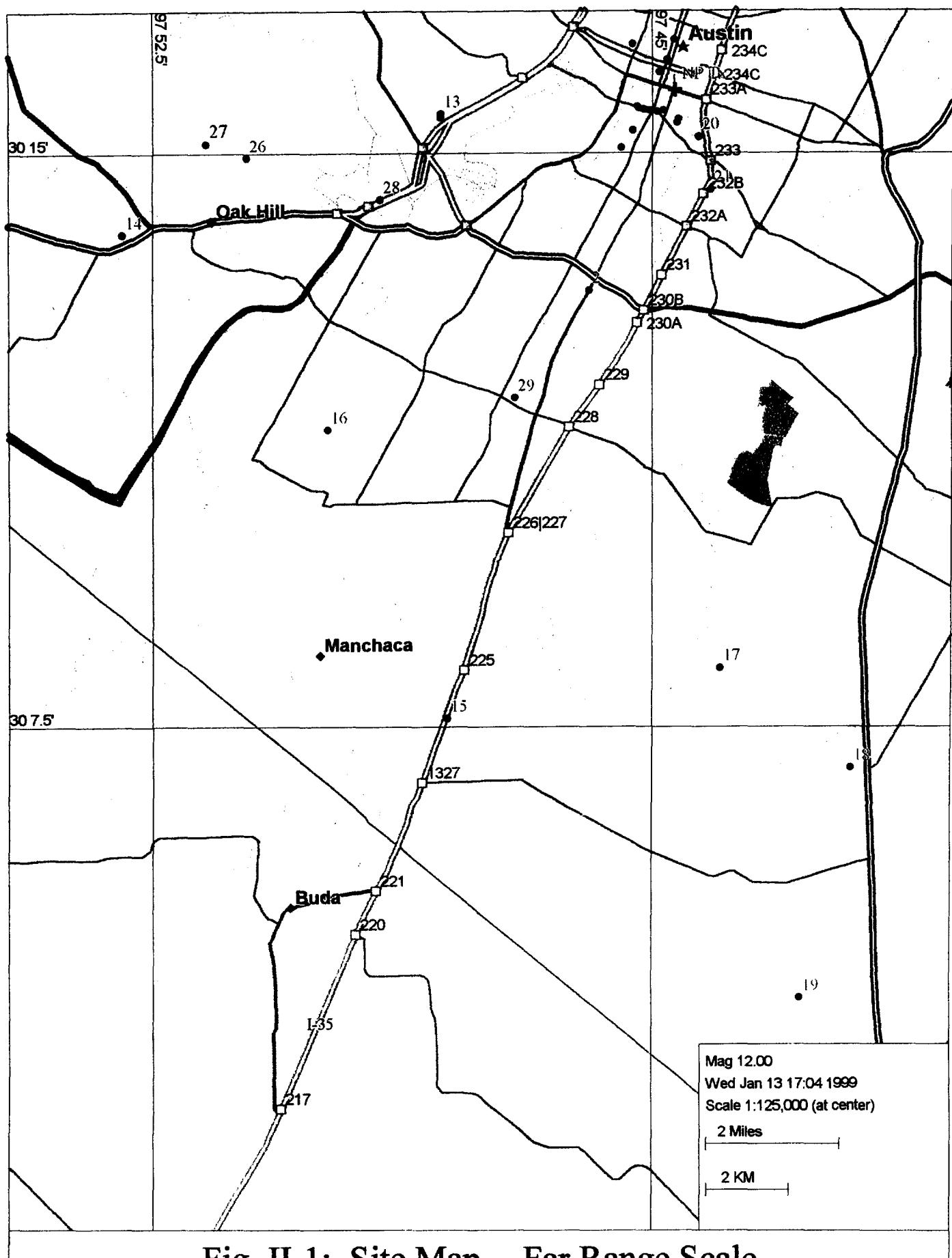
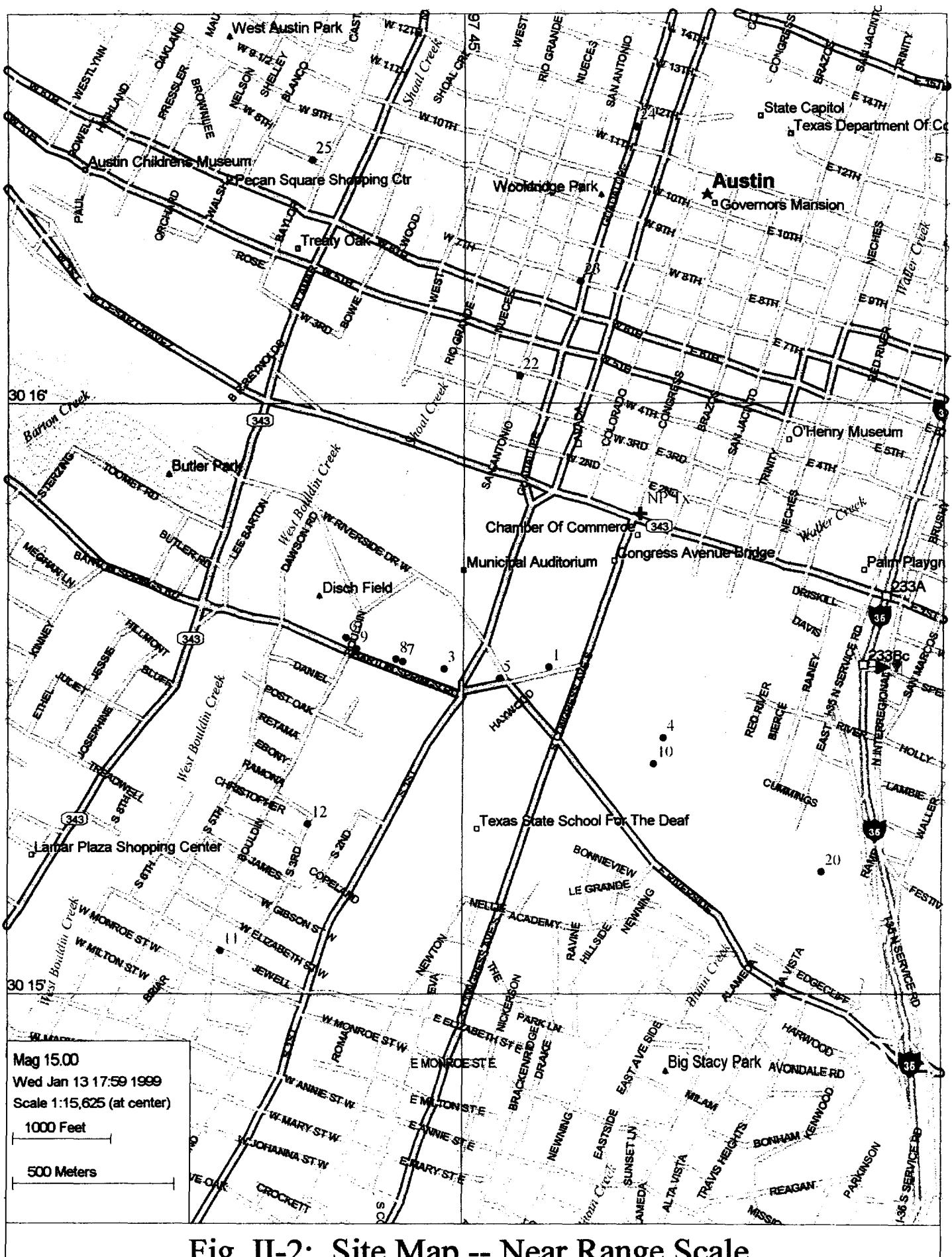
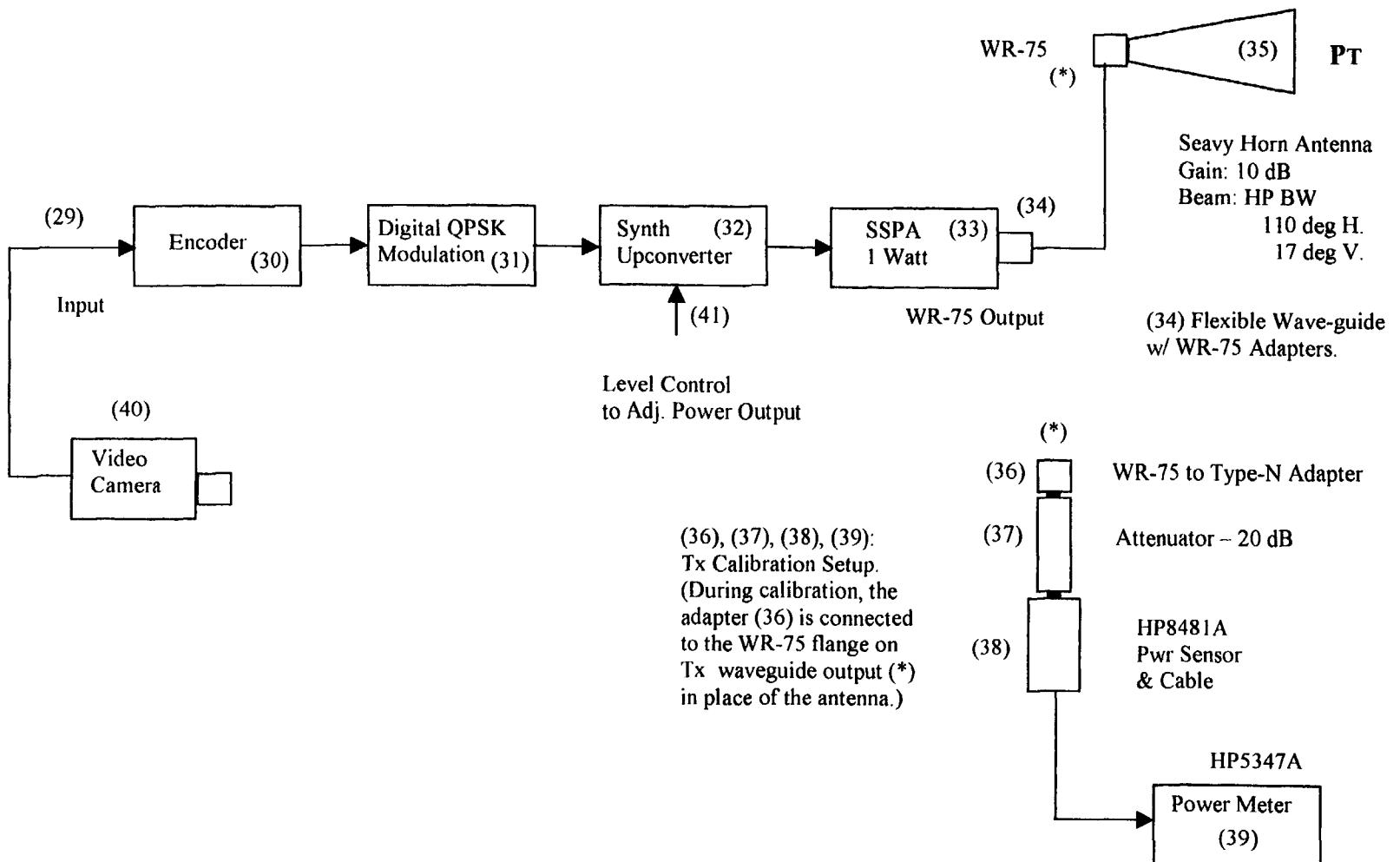


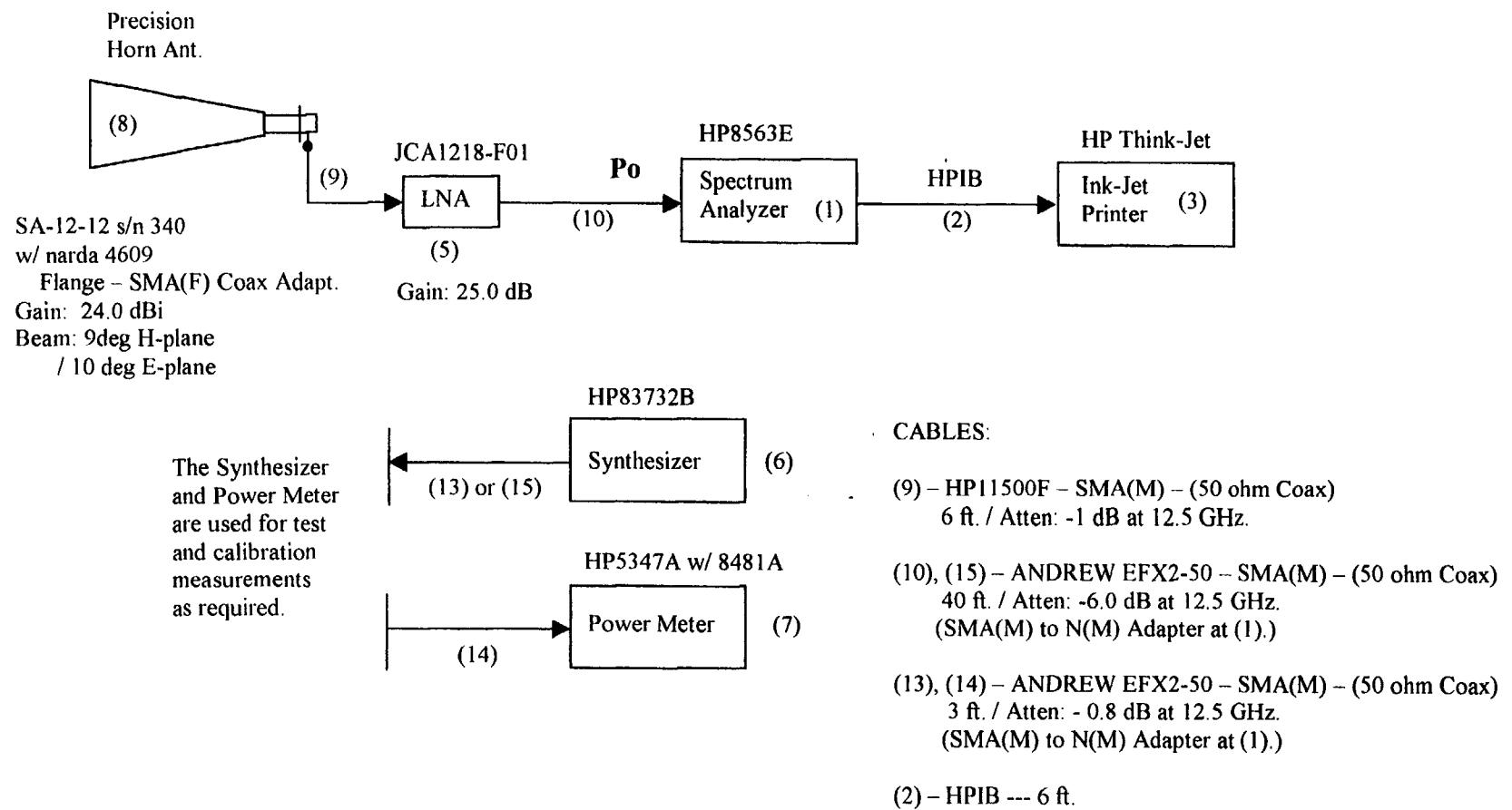
Fig. II-1: Site Map -- Far Range Scale



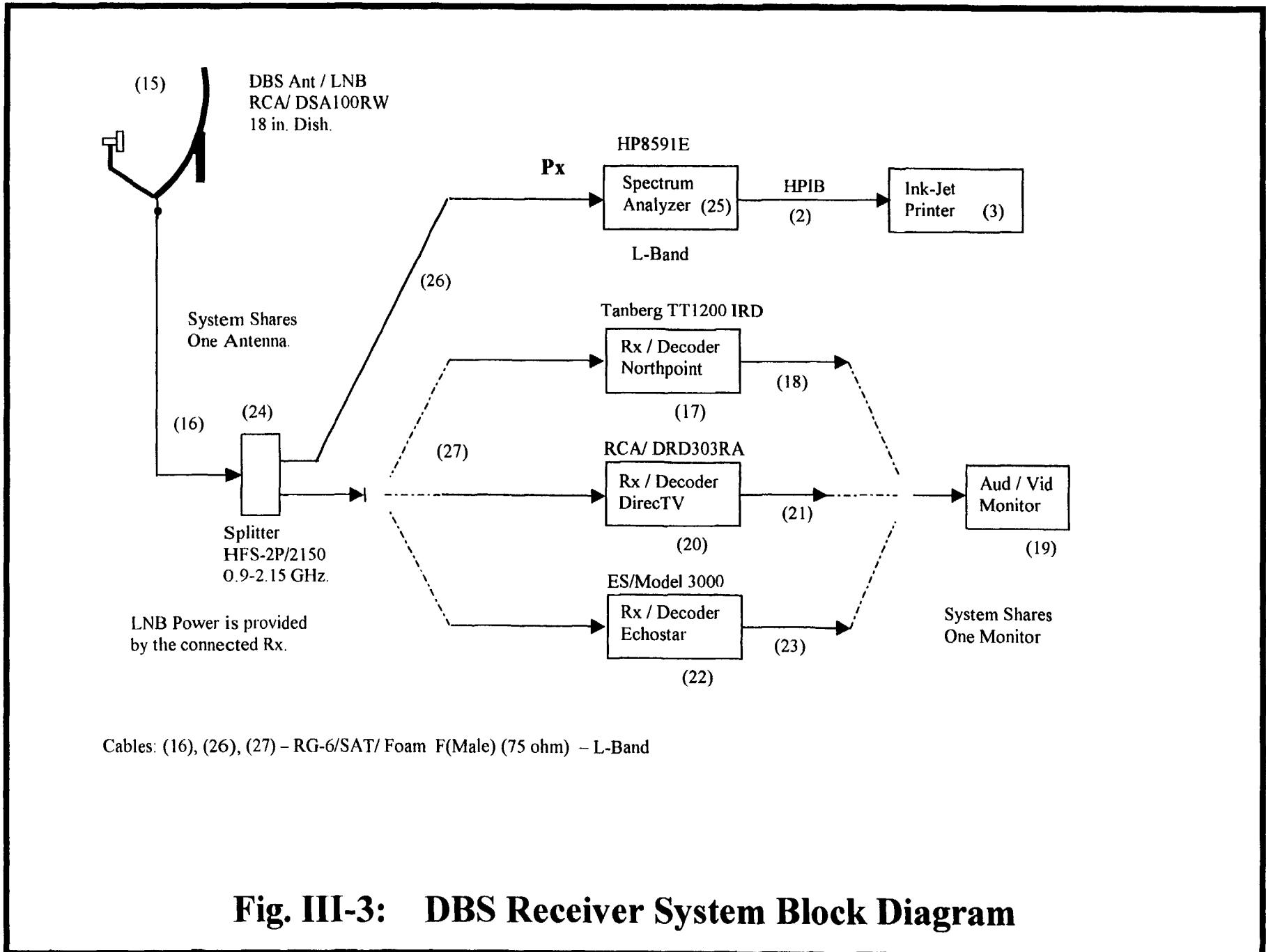
**Fig. II-2: Site Map -- Near Range Scale**

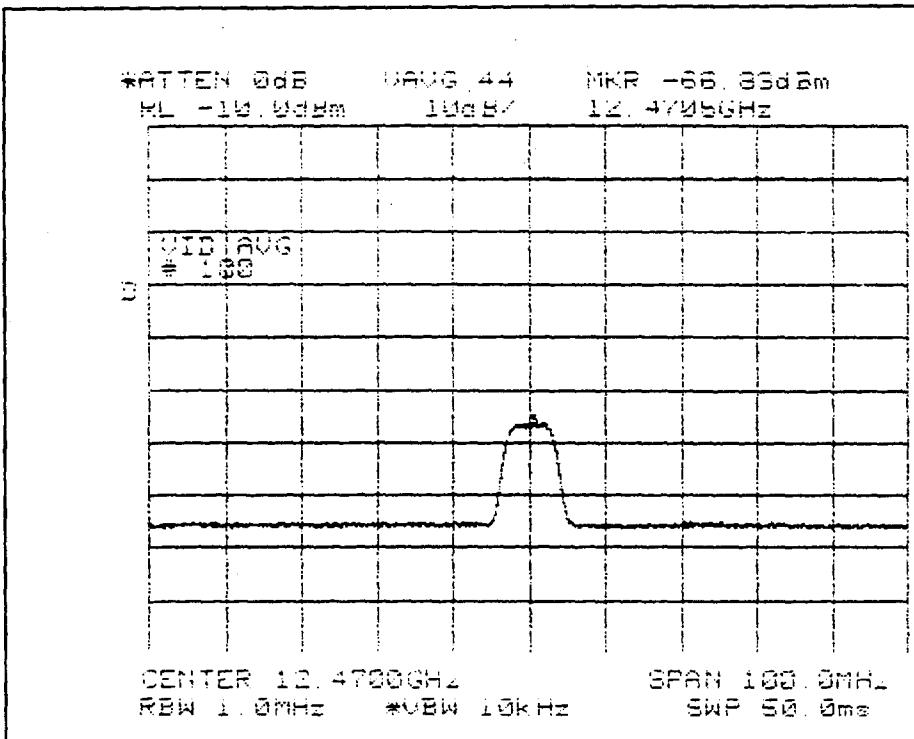


**Fig. III-1: Northpoint Terrestrial Transmitter Block Diagram.**

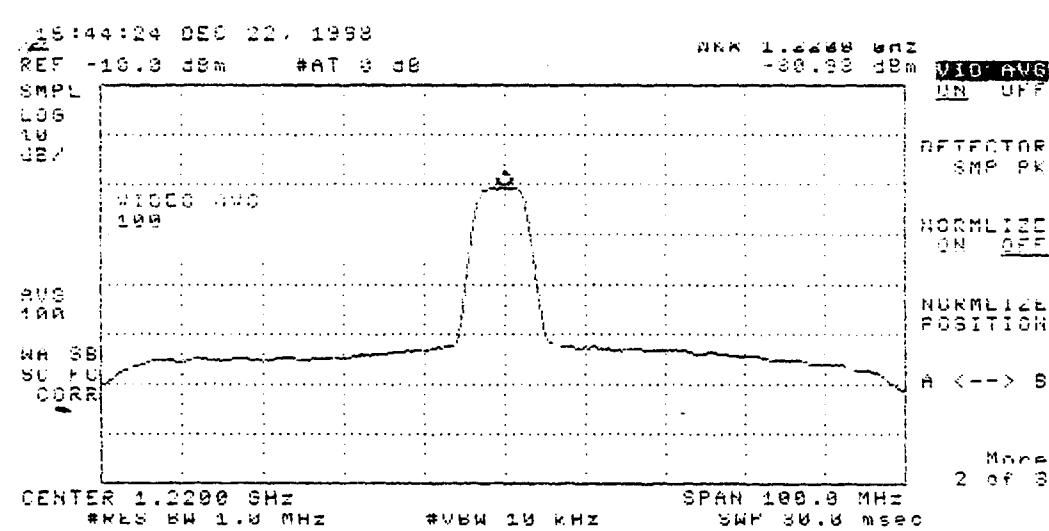


**Fig. III-2: Test Set System Block Diagram.**





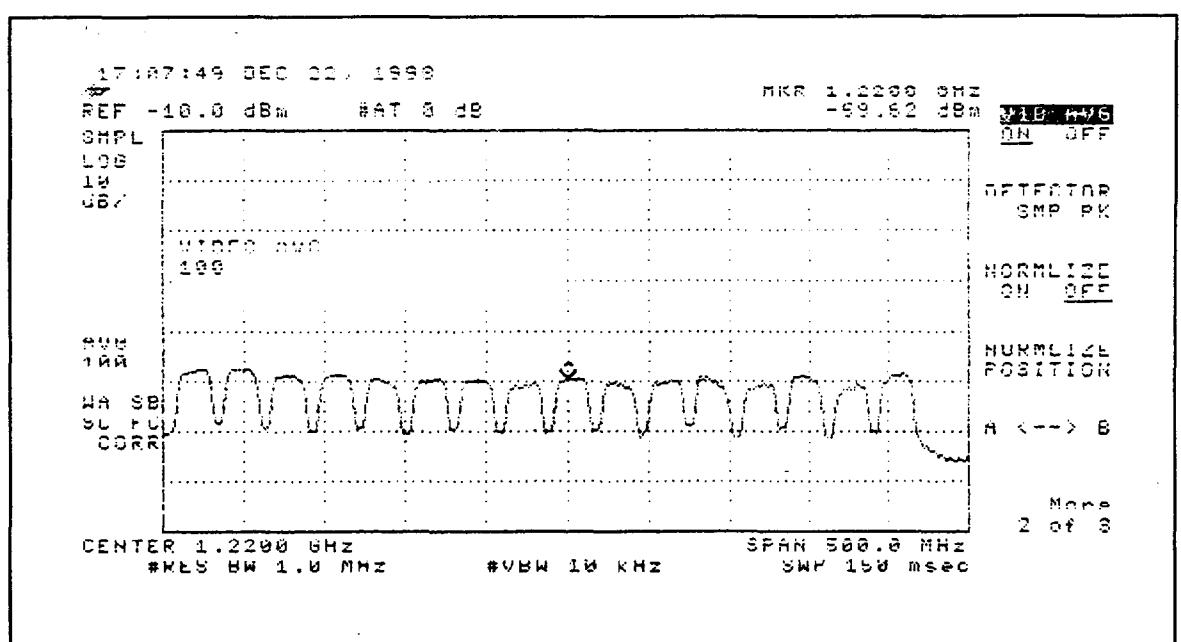
(a) NP Signal Power Spectrum – Po (Ku-Band)  
 -Test Set and Precision Horn  
 -HP8563E Spectrum Analyzer



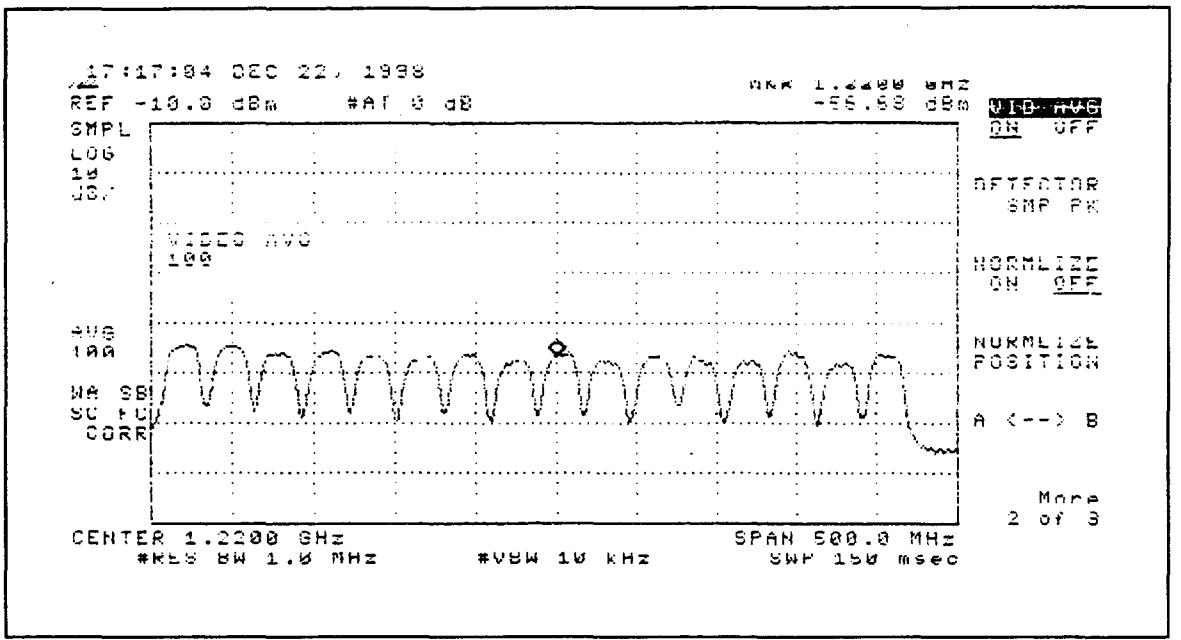
(b) NP Signal Power Spectrum – Px (L-Band)  
 - DBS System and DBS Antenna  
 - HP8591E Spectrum Analyzer

### Fig. IV-1: Sample Signal Power Spectrum -- Site 1

- (a) Test Set with Precision Antenna to NP-Tx
- (b) DBS System with DBS Antenna to NP-Tx



(a) Direct TV Signal – Px (L-Band)  
-HP8591E Spectrum Analyzer



(b) Echostar – Px (L-Band)  
- HP8591E Spectrum Analyzer

### **Fig. IV-2: Sample Signal Power Spectrum -- Site 1**

- (a) DBS System with DBS Antenna to DTV Satellite
- (b) DBS System with DBS Antenna to Echostar Satellite

**Fig. IV-3: TABLE -- Site Coordinates**

Site No.	Name	Latitude	Longitude	Elevation	Polar Position from Tx		
		(deg)	(deg)	(feet)	Azimuth (deg)	Range (m) (mi)	
0	NP Transmitter (Tx)	N 30.26355	W 97.74430	450			
1	Hyatt	N 30.25922	W 97.74725	443	-146.0	587	0.364
2	Salvation Army	N 30.22042	W 97.76594	640	-153.4	5368	3.335
3	Palmer	N 30.25917	W 97.75064	445	-125.0	860	0.534
4	American-Statesman	N 30.25722	W 97.74353	445	173.1	714	0.444
5	Jalisco's	N 30.25892	W 97.74883	444	-135.9	724	0.450
6	Coliseum	N 30.26008	W 97.75377	463	-110.4	1122	0.697
7	Palmer *1	N 30.25940	W 97.75193	456	-118.8	968	0.602
8	Palmer *2	N 30.25947	W 97.75217	454	-117.7	987	0.613
9	Palmer *3	N 30.25977	W 97.75343	462	-112.8	1101	0.684
9A	Palmer *3	N 30.25977	W 97.75343	462	-112.8	1101	0.684
10	TX-DOT	N 30.25647	W 97.74383	450	176.3	794	0.493
11	3rd St.& Jewell	N 30.25122	W 97.75780	530	-132.5	2036	1.265
12	3rd & Christopher	N 30.25480	W 97.75498	504	-129.5	1538	0.956
13	Barton Creek. Mall	N 30.25850	W 97.80300	676	-95.0	6547	4.068
13A	Barton Creek Mall	N 30.25763	W 97.80310	677	-95.8	6567	4.081
13A-2	Barton Creek Mall	N 30.25763	W 97.80310	677	-95.8	6567	4.081
14	Acc Pinnacle	N 30.23261	W 97.88272	899	-102.6	15762	9.794
15	IH-35 South	N 30.12685	W 97.80125	647	-157.4	16461	10.228
16	Davis Ln Hill	N 30.19008	W 97.83123	793	-130.2	12651	7.861
17	Thaxton	N 30.13787	W 97.73312	608	174.9	14027	8.716
18	Guerrero	N 30.11595	W 97.70005	600	163.3	17128	10.643
19	Glass Rd	N 30.06557	W 97.71282	652	171.0	22282	13.845
20	Fiesta Shores	N 30.25344	W 97.73839	450	149.8	1306	0.811
21	Summit	N 30.24197	W 97.73535	509	157.5	2601	1.616
22	4th St & SanAntonio	N 30.26745	W 97.74822	471	-45.5	610	0.379
23	7th St & Guadalupe	N 30.27008	W 97.74625	496	-16.7	752	0.467
24	11th St & Guadalupe	N 30.27438	W 97.74445	520	-0.8	1198	0.745
25	7th St & Baylor	N 30.27347	W 97.75490	509	-47.1	1609	1.000
26	Southwest Pky 1	N 30.24908	W 97.85162	864	-97.7	12034	7.477
27	Southwest Pky 2	N 30.25220	W 97.86173	927	-95.5	13111	8.147
28	Gains Ranch Rd	N 30.24011	W 97.81819	700	-107.6	8616	5.354
29	HEB 1st & WnCannon	N 30.19703	W 97.78453	669	-148.9	8643	5.371

**Fig. IV-4: TABLE -- Field Data Summary**

Site	Sig. Power Px & Monitor Status (dBm in 1MHz RBW)						Ant.	DBS Sig. Strength Power (SSP) values (0-100) scale						Weather Condx.	Date	Time	Comments	
	DTV	Pic	ES	Pic	NP	Plc	(AGL)	T-16	T-18	T-20	T-16	T-18	T-20	Temp.	Sky	Rain		
No.	Name	(dBm)	(dBm)	(dBm)														
1	Hyatt	-59.62	ok	-56.63	ok	-30.93	ok	4 ft	78.3	67.2	79.3	93.0	93.2	95.0	20-30	OC	No	12/22/98 16:42 CST
2	Salvation Army	-68.65	ok	-59.17	ok	-62.41	M	21.5 ft	85.5	84.1	86.7	86.8	85.8	86.5	30-35	OC	Yes	12/23/98 14:45 CST
3	Palmer	-60.44	ok	-58.00	ok	-33.80	ok	4 ft	75.8	62.6	75.2	89.0	89.2	91.3	30	OC	No	12/22/98 10:55 CST
4	American-Statesman	-59.62	ok	-58.68	ok	-35.76	ok	4 ft	82.9	77.0	83.5	86.5	79.0	87.6	30-35	OC	Yes	12/23/98 11:25 CST
5	Jalisco's	-58.63	ok	-56.98	ok	-63.51	ok	4 ft	85.8	83.8	86.2	92.7	93.6	94.9	30-35	OC	No	12/22/98 15:50 CST
6	Coliseum	-58.88	ok	-57.87	ok	-53.67	ok	4 ft	80.3	78.4	81.0	90.8	89.8	92.9	30-35	OC	No	12/22/98 14:49 CST
7	Palmer *1	-59.72	ok	-59.21	ok	-34.56	ok	4 ft	79.8	73.2	80.8	87.2	87.0	89.3	30-35	OC	No	12/22/98 11:35 CST
8	Palmer *2	-60.14	ok	-58.10	ok	-58.15	ok	4 ft	77.9	75.3	78.5	89.6	91.0	92.0	30-35	OC	No	12/22/98 12:10 CST
9	Palmer *3	-60.39	ok	-61.25	ok	-38.84	ok	15 ft	64.7	60.6	68.8	65.6	61.1	66.4	30-35	OC	No	12/22/98 12:39 CST
9A	Palmer *3	-68.49	ok	-59.37	ok	-46.07	ok	4 ft	N/A	N/A	N/A	N/A	N/A	N/A	30-35	OC	No	12/22/98 12:40 CST
10	TX-DOT	-59.52	ok	-59.29	ok	-61.27	ok	4 ft	80.0	78.3	81.2	84.7	83.6	85.9	30-35	OC	Yes	12/23/98 13:55 CST
11	3rd St.& Jewell	-60.44	ok	-59.12	ok	-53.76	ok	4 ft	86.7	85.6	88.8	90.3	90.1	92.3	60	Clr	No	12/28/98 10:20 CST
12	3rd & Christopher	-63.25	ok	-59.99	ok	-58.29	ok	7.5 ft	69.6	65.6	70.0	83.7	83.5	86.2	70	PC	No	12/28/98 11:30 CST
13	Barton Creek. Mall	-61.58	ok	-59.37	ok	-63.42	ok	4 ft	83.4	80.2	83.4	92.9	92.8	95.4	70	MC	No	12/28/98 12:45 CST
13A	Barton Creek Mall	-60.62	ok	-59.26	ok	-57.99	ok	4 ft	85.7	84.3	86.5	90.5	89.7	93.0	70	PC	No	12/28/98 13:40 CST
13A-2	Barton Creek Mall	-60.37	ok	-58.48	ok	-50.78	ok	4 ft	86.1	85.4	86.5	91.2	91.0	93.9	65	Clr	No	12/30/98 10:45 CST
14	Acc Pinnacle	-60.11	ok	-60.17	ok	-62.07	ok	4 ft	84.8	83.7	86.0	89.2	87.8	91.2	70	PC	No	12/28/98 14:30 CST
15	IH-35 South	-61.10	ok	-58.88	ok	-61.62	ok	4 ft	84.0	82.2	85.6	91.5	91.0	93.5	70	PC	No	12/28/98 16:50 CST
16	Davis Ln Hill	-60.22	ok	-62.35	ok	-58.42	ok	28 ft	88.1	86.6	88.9	80.7	79.8	83.0	65	Clr	No	12/29/98 12:15 CST
17	Thaxton	-60.89	ok	-58.96	ok	-59.30	ok	4 ft	85.9	85.7	85.7	93.4	92.9	95.7	65	Clr	No	12/29/98 15:10 CST
18	Guerrero	-61.64	ok	-61.47	ok	-63.60	ok	4 ft	79.8	78.9	80.4	84.6	83.8	86.4	65	Clr	No	12/29/98 16:05 CST
19	Glass Rd	-61.12	ok	-58.54	ok	-63.18	ok	4 ft	81.9	80.5	82.8	93.3	93.2	95.9	65	Clr	No	12/29/98 17:00 CST
20	Fiesta Shores	-60.73	ok	-58.98	ok	-59.36	ok	33 ft	81.8	79.9	80.6	88.8	88.8	90.8	65	Clr	No	12/30/98 11:44 CST
21	Summit	-59.80	ok	-59.42	ok	-50.86	ok	4 ft	85.6	84.4	86.1	89.4	88.4	91.3	65-70	Clr	No	12/30/98 14:10 CST
22	4th St & San Antonio	-61.85	ok	-59.62	ok	-48.20	ok	4 ft	78.1	75.4	78.3	88.1	88.2	89.8	65-70	Clr	No	12/30/98 15:04 CST
23	7th St & Guadalupe	-60.34	ok	-58.96	ok	-50.37	ok	4 ft	85.6	85.2	86.3	91.5	89.4	94.1	65-70	Clr	No	12/30/98 15:53 CST
24	11th St & Guadalupe	-61.61	ok	-58.95	ok	-52.87	ok	4 ft	80.1	77.9	80.3	91.8	90.4	94.2	65-70	Clr	No	12/30/98 16:35 CST
25	7th St & Baylor	-60.79	ok	-59.18	ok	-57.63	ok	4 ft	81.5	79.1	81.8	89.0	87.9	91.6	65-70	Clr	No	12/30/98 17:20 CST
26	Southwest Pky 1	-61.27	ok	-60.01	ok	-64.09	ok	4 ft	80.9	79.1	81.8	86.9	86.6	88.9	60-65	Fog	Yes	12/31/98 11:30 CST
27	Southwest Pky 2	-60.98	ok	-60.32	ok	-59.00	ok	4 ft	82.9	81.1	83.2	87.9	87.1	90.3	60-65	Fog	Yes	12/31/98 12:20 CST
28	Gains Ranch Rd	-61.45	ok	-59.96	ok	-53.28	ok	4 ft	80.5	78.6	81.0	89.5	88.9	91.4	60-65	Fog	No	12/31/98 13:00 CST
29	HEB 1st & WnCannon	-60.97	ok	-60.37	ok	-64.78	ok	~27 ft	80.4	79.2	80.7	86.2	85.2	88.4	60-65	Fog	No	12/31/98 15:30 CST

Legend: DTV--Direct TV DPS Transponders -- T-16, T-18, T-20

ES -- EchoStar SPP -- DBS Signal Strength Power Average

NP -- Northpoint Px -- Signal Power Density at LNB output via Splitter -- see Fig. III-3

Clr -- Clear PC -- Partly Cloudy MC -- Mostly Cloudy OC -- OverCast

**Fig. IV-5: TABLE -- Signal Powers and Signal Strength Pointer Index  
-- Power Spectral Density -- Isotropic References**

Site	Sig. Power Density - Isotropic						Sig. Strength Pointer Ref. -- sspo			NP-DBS Ratio (dB)						
	Pxi - (dBm - 1MHz RBW)			Pointer Depression Increment - dssp												
	DTV	ES	NP	DTV	ES	pdx										
No.	Name			sspo	dssp	pdx	sspo	dssp	pdx	DTV	ES					
1	Hyatt	-137.52	-134.53	-108.83	78.8	11.6	0.85	94.0	0.8	0.99	28.69	25.70				
2	Salvation Army	-146.55	-137.07	-140.31	86.1	2.0	0.98	86.7	0.9	0.99	6.24	-3.24				
3	Palmer	-138.34	-135.90	-111.70	75.5	12.9	0.83	90.2	1.0	0.99	26.64	24.20				
4	American Statesman	-137.52	-136.58	-113.66	83.2	6.2	0.93	87.1	8.1	0.91	23.86	22.92				
5	Jalisco's	-136.53	-134.88	-141.41	86.0	2.2	0.97	93.8	0.2	1.00	-4.88	-6.53				
6	Coliseum	-136.78	-135.77	-131.57	80.7	2.3	0.97	91.9	2.1	0.98	5.21	4.20				
7	Palmer *1	-137.62	-137.11	-112.46	80.3	7.1	0.91	88.3	1.3	0.99	25.16	24.65				
8	Palmer *2	-138.04	-136.00	-136.05	78.2	2.9	0.96	90.8	-0.2	1.00	1.99	-0.05				
9	Palmer *3	-138.29	-139.15	-116.74	66.8	6.2	0.91	66.0	4.9	0.93	21.55	22.41				
9A	Palmer *3	-146.39	-137.27	-123.97	N/A	N/A	N/A	N/A	N/A	N/A	22.42	13.30				
10	TX-DOT	-137.42	-137.19	-139.17	80.6	2.3	0.97	85.3	1.7	0.98	-1.75	-1.98				
11	3rd St & Jewell	-138.34	-137.02	-131.66	87.8	2.2	0.98	91.3	1.2	0.99	6.68	5.36				
12	3rd & Christopher	-141.15	-137.89	-136.19	69.8	4.2	0.94	85.0	1.5	0.98	4.96	1.70				
13	Barton Creek Mall	-139.48	-137.27	-141.32	83.4	3.2	0.96	94.2	1.4	0.99	-1.84	-4.05				
13A	Barton Creek Mall	-138.52	-137.16	-135.89	86.1	1.8	0.98	91.8	2.1	0.98	2.63	1.27				
13A-2	Barton Creek Mall	-138.27	-136.38	-128.68	86.3	0.9	0.99	92.6	1.6	0.98	9.59	7.70				
14	Acc Pinnacle	-138.01	-138.07	-139.97	85.4	1.7	0.98	90.2	2.4	0.97	-1.96	-1.90				
15	IH-35 South	-139.00	-136.78	-139.52	84.8	2.6	0.97	92.5	1.5	0.98	-0.52	-2.74				
16	Davis Ln Hill	-138.12	-140.25	-136.32	88.5	1.9	0.98	81.9	2.1	0.97	1.80	3.93				
17	Thaxton	-138.79	-136.86	-137.20	85.8	0.1	1.00	94.6	1.7	0.98	1.59	-0.34				
18	Guerrero	-139.54	-139.37	-141.50	80.1	1.2	0.99	85.5	1.7	0.98	-1.96	-2.13				
19	Glass Rd	-139.02	-136.44	-141.08	82.4	1.8	0.98	94.6	1.4	0.99	-2.06	-4.64				
20	Fiesta Shores	-138.63	-136.88	-137.26	81.2	1.3	0.98	89.8	1.0	0.99	1.37	-0.38				
21	Summit	-137.70	-137.32	-128.76	85.9	1.4	0.98	90.4	1.9	0.98	8.94	8.56				
22	4th St & San Antonio	-139.75	-137.52	-126.10	78.2	2.8	0.96	89.0	0.7	0.99	13.65	11.42				
23	7th St & Guadalupe	-138.24	-136.86	-128.27	86.0	0.7	0.99	92.8	3.4	0.96	9.97	8.59				
24	11th St & Guadalupe	-139.51	-136.85	-130.77	80.2	2.3	0.97	93.0	2.6	0.97	8.74	6.08				
25	7th St & Baylor	-138.69	-137.08	-135.53	81.7	2.6	0.97	90.3	2.4	0.97	3.16	1.55				
26	Southwest Pky 1	-139.17	-137.91	-141.99	81.4	2.3	0.97	87.9	1.3	0.99	-2.82	-4.08				
27	Southwest Pky 2	-138.88	-138.22	-136.9	83.1	2.0	0.98	89.1	2.0	0.98	1.98	1.32				
28	Gains Ranch Rd	-139.35	-137.86	-131.18	80.8	2.2	0.97	90.5	1.6	0.98	8.17	6.68				
29	HEB 1st & WnCannon	-138.87	-138.27	-142.68	80.6	1.4	0.98	87.3	2.1	0.98	-3.81	-4.41				

Notes: NP - TX operating at output power - 12.5 dBm

$$\text{sspo} = (\text{ssp}(T16) + \text{ssp}(20)) / 2$$

$$\text{dssp} = \text{sspo} - \text{ssp}(T18) \quad // \quad \text{pdx} = \text{ssp}(T18)/\text{sspo}$$

**Fig. IV-6: TABLE – Signal Powers and Signal Strength Pointer Index**

– Total Signal Power in Modulation Band. -- Isotropic References												
Site	No.	Name	Sig. Strength Pointer Ref. – sspo						NP-DBS Ratio (dB)			
			Total Signal Power – Isotropic			Pointer Depression Increment – dssp						
			Pxi – (dBm – Modulation Band)	DTV	ES	NP	DTV	ES	DTV	ES		
				sspo	dssp	pdix	sspo	dssp	pdix			
1	Hyatt	-123.72	-120.73	-99.80	78.8	11.6	0.85	94.0	0.8	0.99	23.92	20.93
2	Salvation Army	-132.75	-123.27	-131.28	86.1	2.0	0.98	86.7	0.9	0.99	1.47	-8.01
3	Palmer	-124.54	-122.10	-102.67	75.5	12.9	0.83	90.2	1.0	0.99	21.87	19.43
4	American-Statesman	-123.72	-122.78	-104.63	83.2	6.2	0.93	87.1	8.1	0.91	19.09	18.15
5	Jalisco's	-122.73	-121.08	-132.38	86.0	2.2	0.97	93.8	0.2	1.00	-9.65	-11.30
6	Coliseum	-122.98	-121.97	-122.54	80.7	2.3	0.97	91.9	2.1	0.98	0.44	-0.57
7	Palmer *1	-123.82	-123.31	-103.43	80.3	7.1	0.91	88.3	1.3	0.99	20.39	19.88
8	Palmer *2	-124.24	-122.20	-127.02	78.2	2.9	0.96	90.8	-0.2	1.00	-2.78	-4.82
9	Palmer *3	-124.49	-125.35	-107.71	66.8	6.2	0.91	66.0	4.9	0.93	16.78	17.64
9A	Palmer *3	-132.59	-123.47	-114.94	N/A	N/A	N/A	N/A	N/A	N/A	17.65	8.53
10	TX-DOT	-123.62	-123.39	-130.14	80.6	2.3	0.97	85.3	1.7	0.98	-6.52	-6.75
11	3rd St. & Jewell	-124.54	-123.22	-122.63	87.8	2.2	0.98	91.3	1.2	0.99	1.91	0.59
12	3rd & Christopher	-127.35	-124.09	-127.16	69.8	4.2	0.94	85.0	1.5	0.98	0.19	-3.07
13	Barton Creek. Mall	-125.68	-123.47	-132.29	83.4	3.2	0.96	94.2	1.4	0.99	-6.61	-8.82
13A	Barton Creek Mall	-124.72	-123.36	-126.86	86.1	1.8	0.98	91.8	2.1	0.98	-2.14	-3.50
13A-2	Barton Creek Mall	-124.47	-122.58	-119.65	86.3	0.9	0.99	92.6	1.6	0.98	4.82	2.93
14	Acc Pinnacle	-124.21	-124.27	-130.94	85.4	1.7	0.98	90.2	2.4	0.97	-6.73	-6.67
15	IH-35 South	-125.20	-122.98	-130.49	84.8	2.6	0.97	92.5	1.5	0.98	-5.29	-7.51
16	Davis Ln Hill	-124.32	-126.45	-127.29	88.5	1.9	0.98	81.9	2.1	0.97	-2.97	-0.84
17	Thaxton	-124.99	-123.06	-128.17	85.8	0.1	1.00	94.6	1.7	0.98	-3.18	-5.11
18	Guerrero	-125.74	-125.57	-132.47	80.1	1.2	0.99	85.5	1.7	0.98	-6.73	-6.90
19	Glass Rd	-125.22	-122.64	-132.05	82.4	1.8	0.98	94.6	1.4	0.99	-6.83	-9.41
20	Fiesta Shores	-124.83	-123.08	-128.23	81.2	1.3	0.98	89.8	1.0	0.99	-3.40	-5.15
21	Summit	-123.90	-123.52	-119.73	85.9	1.4	0.98	90.4	1.9	0.98	4.17	3.79
22	4th St. & SanAntonio	-125.95	-123.72	-117.07	78.2	2.8	0.96	89.0	0.7	0.99	8.88	6.65
23	7th St & Guadalupe	-124.44	-123.06	-119.24	86.0	0.7	0.99	92.8	3.4	0.96	5.20	3.82
24	11th St & Guadalupe	-125.71	-123.05	-121.74	80.2	2.3	0.97	93.0	2.6	0.97	3.97	1.31
25	7th St & Baylor	-124.89	-123.28	-126.50	81.7	2.6	0.97	90.3	2.4	0.97	-1.61	-3.22
26	Southwest Pky 1	-125.37	-124.11	-132.96	81.4	2.3	0.97	87.9	1.3	0.99	-7.59	-8.85
27	Southwest Pky 2	-125.08	-124.42	-127.87	83.1	2.0	0.98	89.1	2.0	0.98	-2.79	-3.45
28	Gains Ranch Rd	-125.55	-124.06	-122.15	80.8	2.2	0.97	90.5	1.6	0.98	3.40	1.91
29	HEB 1st & WnCannon	-125.07	-124.47	-133.65	80.6	1.4	0.98	87.3	2.1	0.98	-8.58	-9.18

Notes: NP – TX operating at output power – 12.5 dBm

sspo =  $(ssp(T16) + ssp(20)) / 2$

dssp = sspo - ssp(T18) // pdix = ssp(T18)/sspo

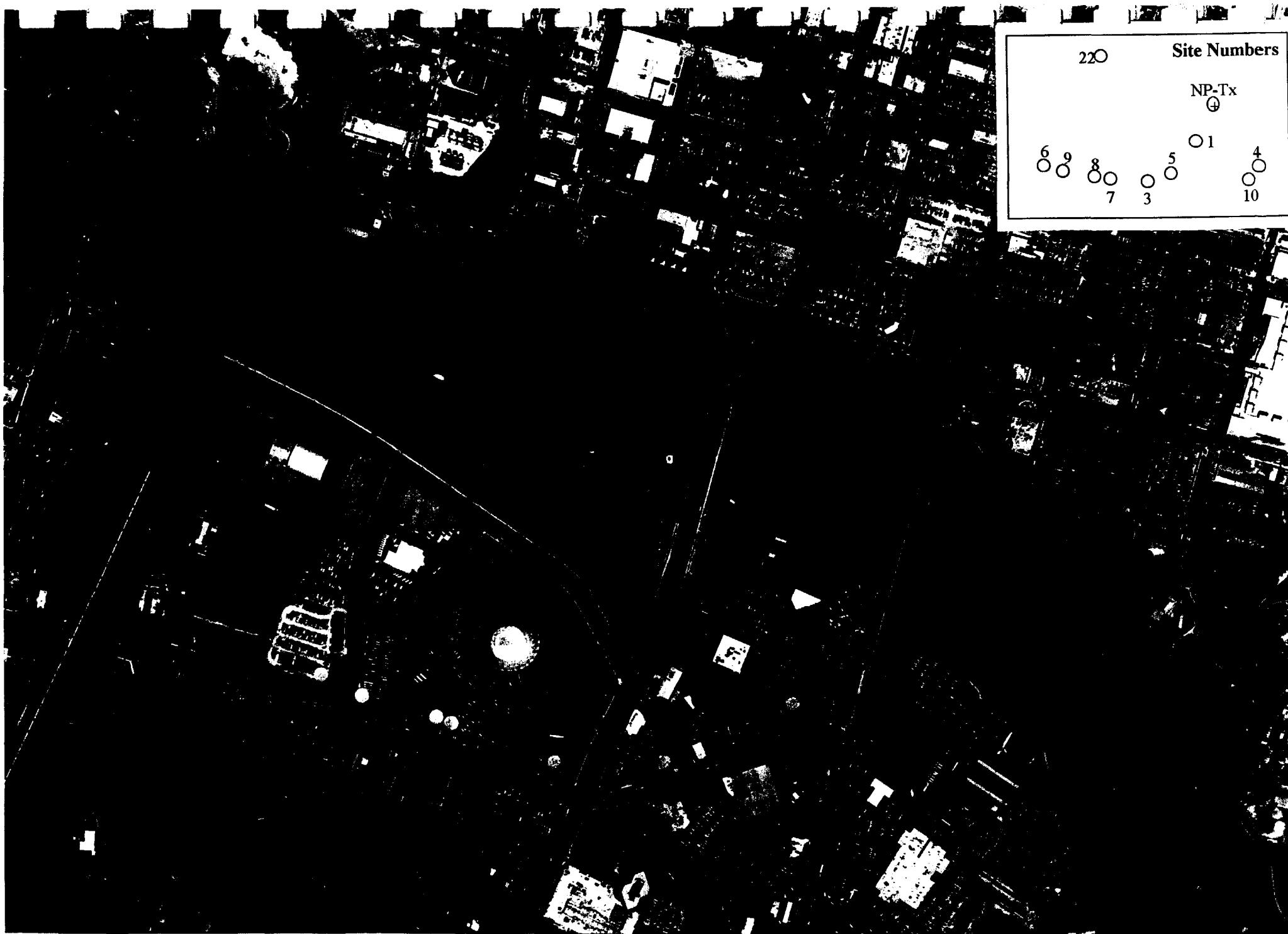
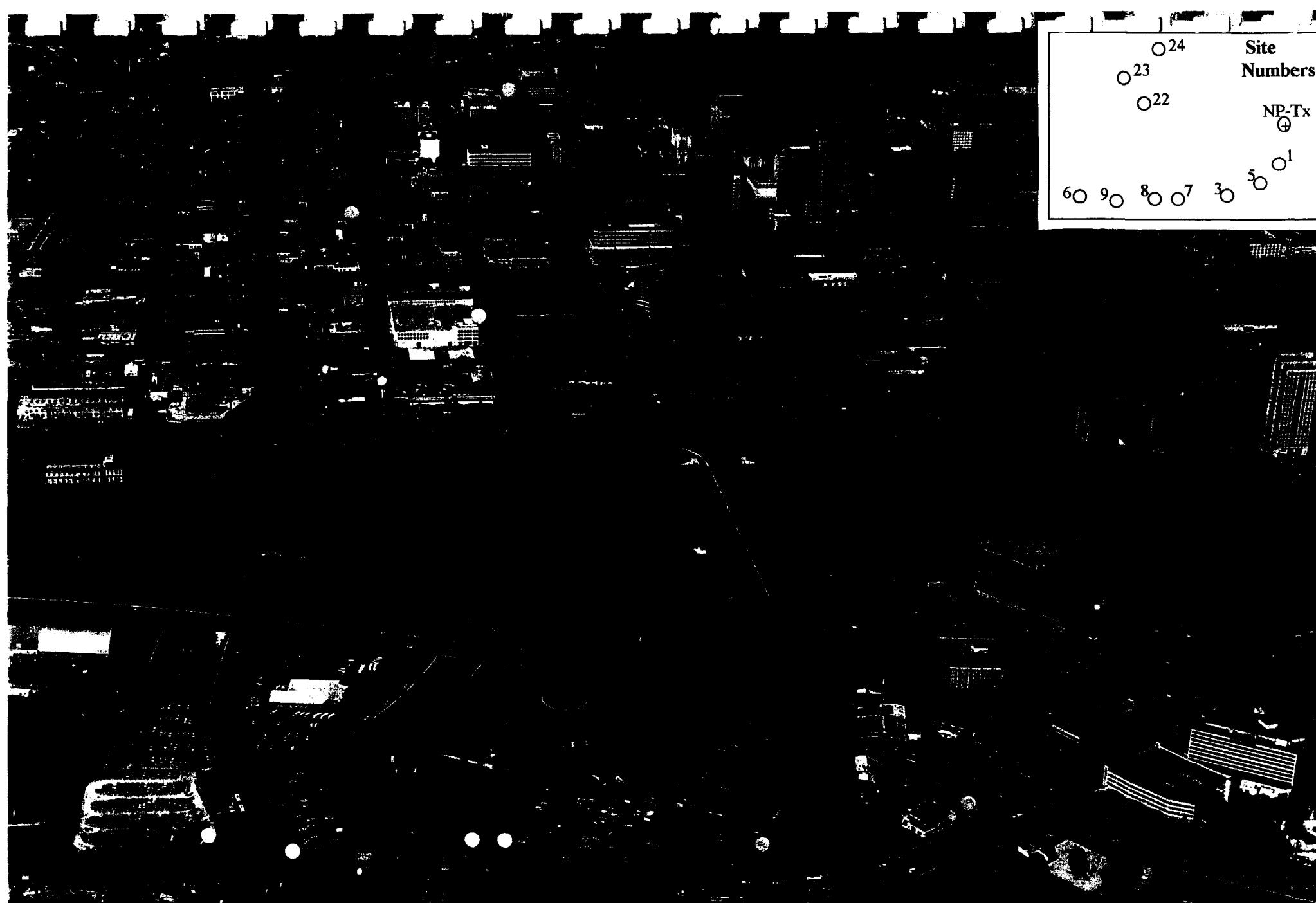


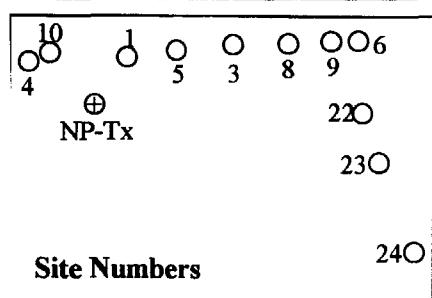
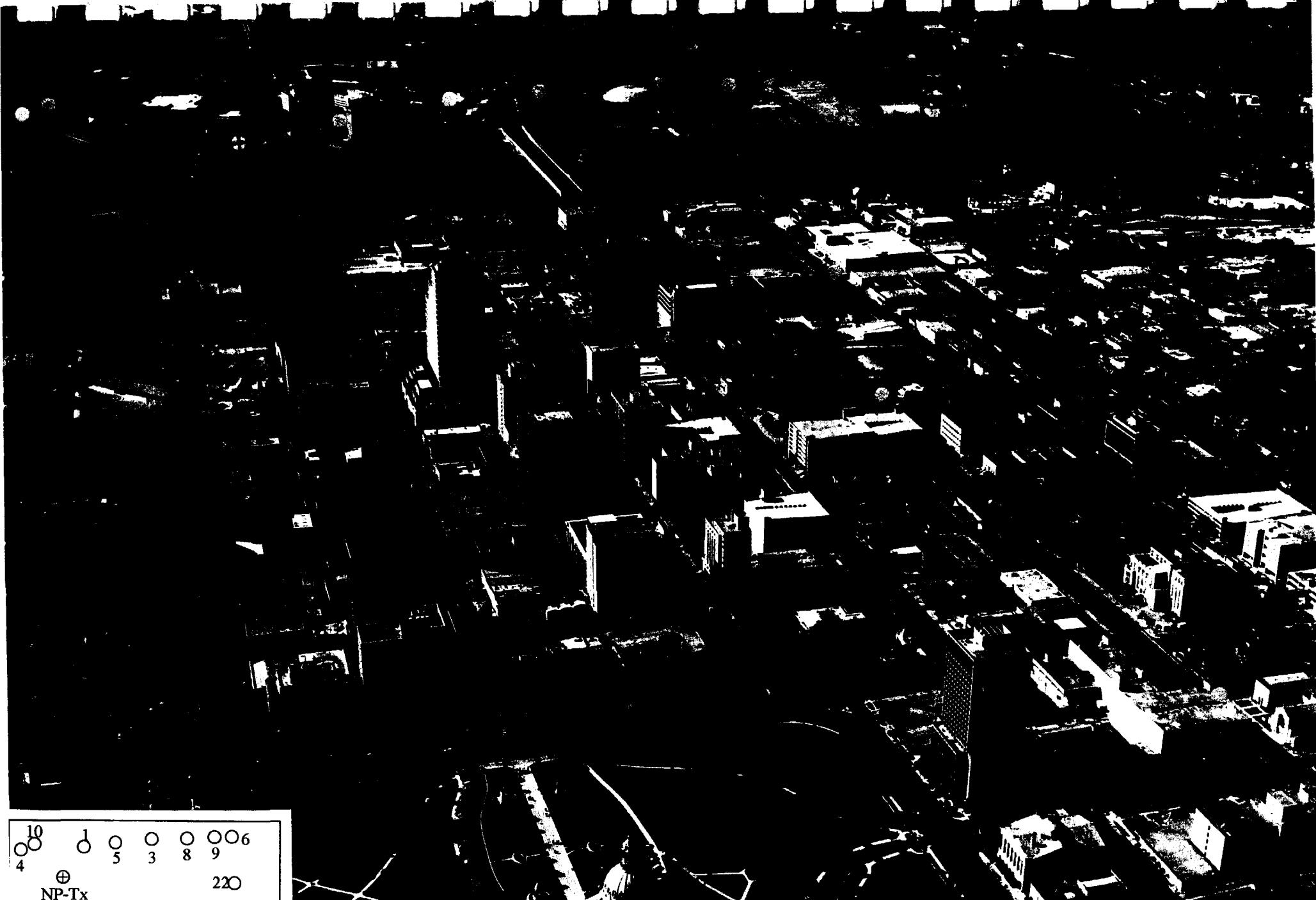
Fig. IV-P1: Photo 1 - NP-Transmitter and Near Range Sites in Vicinity of Palmer Auditorium and Hvatt Hotel -- Plan View [Scale: 1 in = 500 ft]

Northpoint



**Fig. IV-P2: Photo 2 - NP Transmitter and Near Range Sites in Vicinity of Palmer Auditorium and Hyatt Hotel Plus Sites NW of Transmitter.  
--Perspective View to North.**

**Northpoint**



**Fig. IV-P3: Photo 3 - NP Transmitter and Near Range Sites in Vicinity of Palmer Auditorium and Hyatt Hotel Plus Sites NW of Transmitter.**  
**--Perspective View to South.**

Northpoint

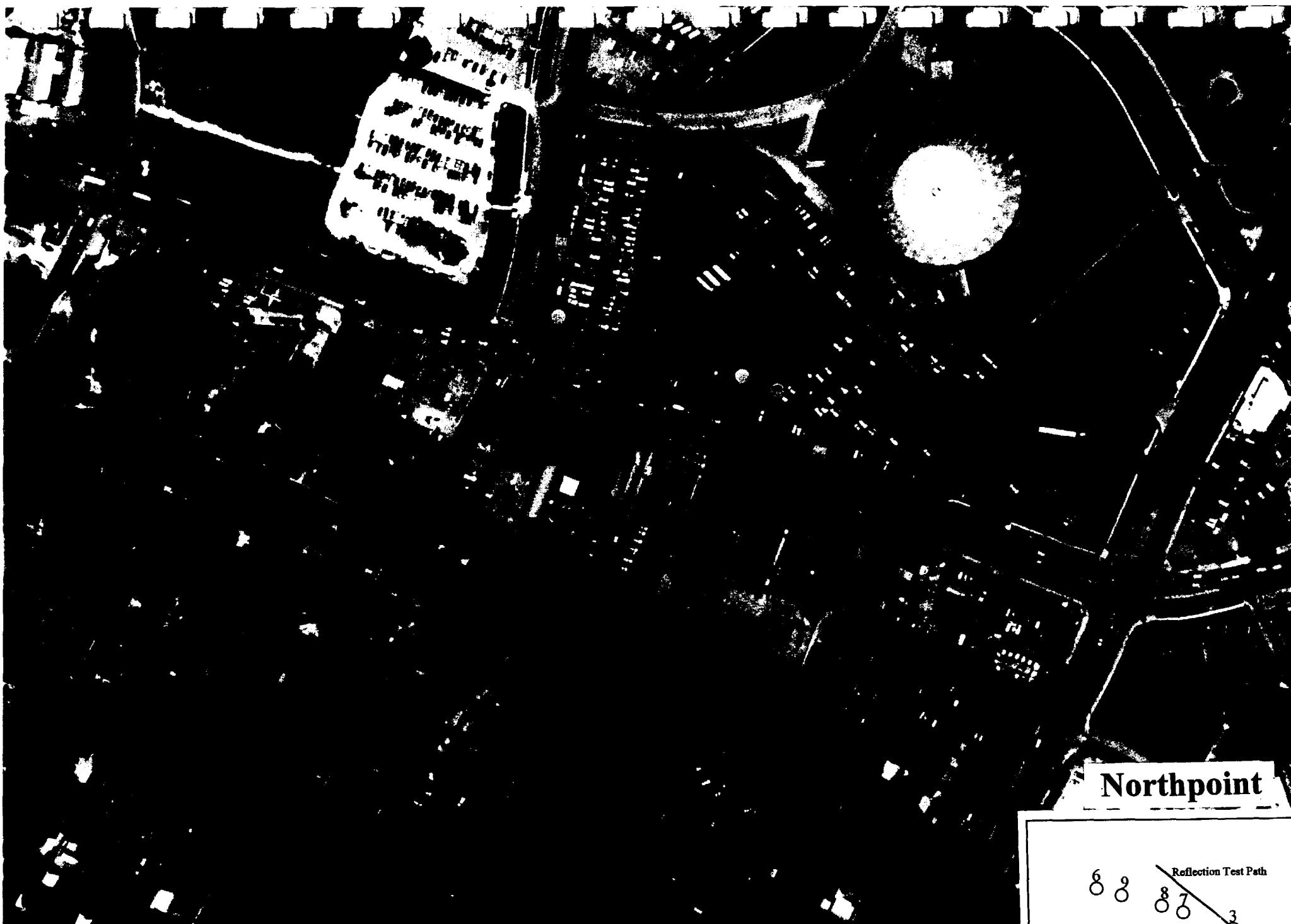


Fig. IV-P4: Photo 4 - Sites Near Palmer Auditorium Related to Signal Reflection Tests  
--Plan View [Scale: 1 in. = 200 ft.l.]

Site Numbers



Site Numbers

○ 22	○ 23	○ 24
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NP-Tx +

**Northpoint**

**Fig. IV-P5: Photo 5 - NP Transmitter and Sites to NW of Transmitter -- Perspective View to NW.**

12  
O



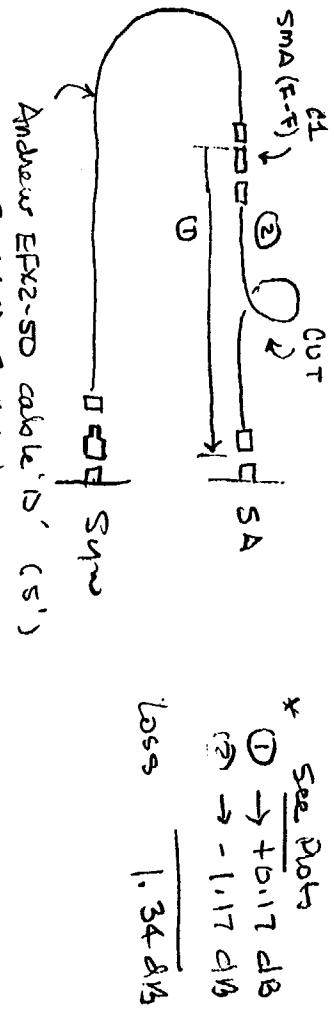
**Fig. IV-P6: Photo 6 - Site 12 In Wooded Residential Area.  
--Plan View [Scale: 1 in. = 200 ft.].**

Northpoint

15 Dec 98

## Draft

Cal cable - Home to LNA - HP11500E - Ref DSW-HP1



Anderson EFX2-50 cable 'D' (5')  
SMA(F) - SMA(M)

- After reading scattering over 0.5 dB - values based on avg.  
of several trip.
- Assume C1 [SMA(F-F) adapt] loss ~ 0.3 dB
- ⇒ assign to DSW-HP1 ⇒ -1.0 dB (insertion loss)

(AMIPAD)

50 SHEETS  
100 SHEETS  
200 SHEETS

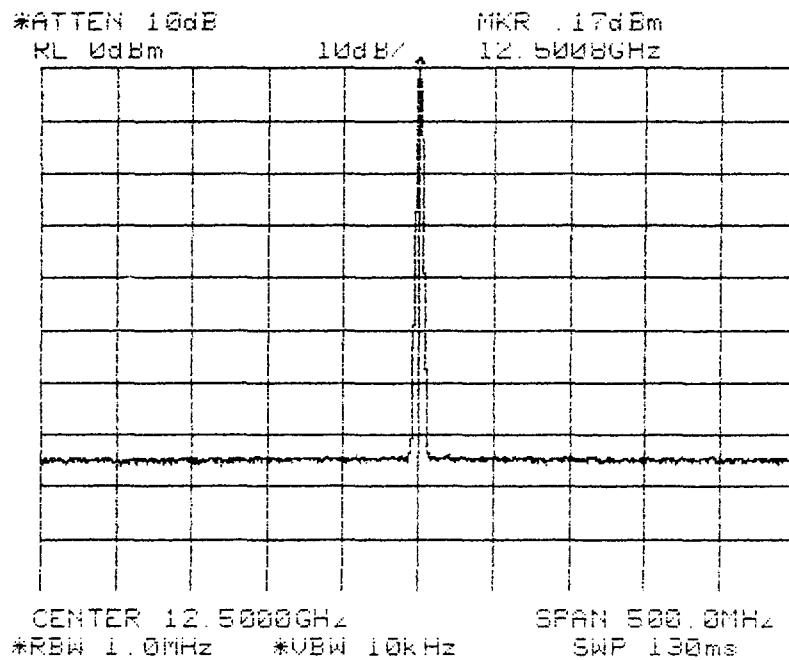
Dew/dec 1 15 Dec 93 Dew

Dew-HPI

Cal of Cable HPI1500F from Telegu

Ref - Dew-HPI

cond x ①



Dew/dce1

15 Dec 93

Dew - APL

Cond x ②

